

ARMED SERVICES BOARD OF CONTRACT APPEALS AND
COMPTROLLER GENERAL CONSIDERATIONS IN
PROCUREMENT CONTRACTS

Russell L. Noble

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THESIS

ARMED SERVICES BOARD OF CONTRACT APPEALS
AND COMPTROLLER GENERAL
CONSIDERATIONS IN PROCUREMENT CONTRACTS

by

Russell L. Noble

September 1974

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The problem areas delineated in this thesis are burden of proof, implied warranties, notice of breach, latent defects, duration of warranty, warranty by government, and scope of the warranty clause. Each one of these problem areas is discussed with briefs of applicable cases and conclusion as to their meaning. The final section of the thesis is a condensation of lessons learned from the cases and suggestions on future warranty use.

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Comptroller General Considerations
in Procurement Contracts

by

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ABSTRACT

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I. INTRODUCTION

A. WHAT IS RELIABILITY/MAINTAINABILITY?

In the field of procurement the ultimate goal should be to produce a system or component of a system that is the lowest life cycle cost and is operationally capable of performing the assigned mission efficiently. Reliability and maintainability are two of the elements of this goal and will be the factors for consideration in this paper.

Reliability is defined by MIL-STD-721B [Ref. 1] as "The probability that an item will perform its intended function for a specified interval under stated conditions." Mathematically reliability is defined as the mean time between failure (MTBF) of a system. To be more reasonable, the reliability of a system is that system's ability to complete a mission without a mission abort failure. Mission abort failure is any failure to the system that causes the intended use of that system to be deleted.

Reliability considerations should start at the earliest phase in the procurement cycle (see Appendix A) and continue throughout development. During the design of a system reliability of the system should be one of the important elements that is considered.

A conscious effort to make the contractor aware of the importance of system reliability should be undertaken. Causing a designer to consider reliability is important to the future characteristic of the system. Revaluation of the

achieved production model reliability should be conducted and efforts undertaken to correct any short-falls in reliability. In summation reliability is the ability of a system to carry out its intended mission. Early consideration of reliability is necessary if the Government is to get the system it needs.

Maintainability is an element that may sometimes be overlooked in the design of a system. How many times has one felt that if that bolt were just one quarter of an inch to the right or left it would take one-half the time to repair that specific system. This type of problem often occurs in a new system destined for the fleet. There is an apparent designer philosophy that puts more concern with performance characteristics and neglects the other important aspect of system design.

MIL-STD-721B [Ref. 1] defines Maintainability as "a characteristic of design and installation which is expressed as the probability that an item will be retained in or restored to a specified condition within a given period of time, when the maintenance is performed in accordance with prescribed procedures and resources." Maintainability is a very important element of system or component acquisition. It is the time that it takes for a repairman to restore a system to a specified condition once he has been allowed to start work on that system. Mean time to repair (MTTR) is the mathematical term used for maintainability. It is the average (mean) time it takes to repair the equipment.

Maintainability and reliability go hand in hand with the ability of the system to accomplish an assigned mission. Once a system becomes inoperative there must be an efficient and effective method of restoring the system to a condition that it can again perform the intended mission. As with reliability, maintainability should be a basic part of the earliest design characteristics. Life cycle cost and trade-off analysis should be made on the type of maintenance that is conducted. Also considerable design effort should be channeled to make the system repairable in the most efficient way.

Maintainability and reliability are very important to the effectiveness of a system. Effectiveness being how well the system performs its mission. The problem in the past has been a falling short of the predicted reliability and maintainability levels of new systems. There should be a way to cause the contractor to think more about these elements when designing a system - something that would put greater emphasis on the designing in of reliability and maintainability that will hit the mark that is set. There should also be a device that will cause a contractor to redesign subsystems or components, at no increase in cost to the Government, that fall short of the design reliability/maintainability goals.

B. WARRANTY CONSIDERATIONS AND THEIR RELATIONSHIP TO RELIABILITY/MAINTAINABILITY

In the Government's quest for an incentive to increase reliability and maintainability considerations on the contractor's part, the use of a warranty has been suggested. At first glance this might be a good solution to the problem. However, a close look at the experience that Government has had with present warranties should be considered before an attempt to expand their use.

The warranty could be used along with other protection devices to make sure the normal expectations of the Government are fulfilled. Normal expectations being the receipt of a system that performs its mission within the parameters that were established during the decision analysis conducted throughout the acquisition cycle. (See Appendix B). A warranty can be misconstrued as a panacea or cure all for incentivizing the contractor to produce the system to reliability and maintainability requirements. Care should be taken to investigate the use of a warranty as part of the total package of incentives to the contractor.

Continuing with the idea that a warranty may be one way to cause reliability/maintainability growth, a look at the warranty in more detail is warranted. ASPR defines a warranty clause as follows:

"....the Government a contractual right to assert claims regarding the deficiency of supplies or services furnished, notwithstanding any other contractual provisions pertaining to acceptance by the Government. Such a clause allows the Government

additional time after acceptance in which to assert a right to correction of the deficiencies or defects, reperformance, an equitable adjustment in the contract price, or other remedies. This additional period of time may begin at the time of delivery or at the occurrence of a specified event, and may run for a given number of days or months or until occurrence of another specified event. The value of a warranty clause depends upon the circumstances, and its use, terms, and conditions are influenced by many factors. A warranty clause may therefore be tailored to fit the individual procurement or class of procurements."

[Ref. 2]

The Uniform Commercial Code breaks the warranty down into implied warranties and expressed warranties. Implied warranties will be defined and discussed later. According to the Uniform Commercial Code (2-313):

"1) Express warranties by the seller are created as follows:

a) Any affirmation of fact or promise made by the seller to the buyer which relates to the goods and becomes part of the basis of the bargain creates an express warranty that the goods shall conform to the affirmation or promise.

b) Any description of the goods which is made part of the basis of the bargain creates an express warranty that the goods shall conform to the description.

c) Any sample or model which is made part of the basis of the bargain creates an express warranty that the whole of the goods shall conform to the sample or model.

2) It is not necessary to the creation of an express warranty that the seller use formal words such as 'warranty' or 'guarantee' or that he have a specific intention to make a warranty, but an affirmation merely of the value of the

goods or as a statement purporting to be merely the seller's opinion or commendation of the goods does not create a warranty."

ASPR's policy on warranty use is as follows:

"a) A warranty clause shall be used when it is found to be in the best interest of the Government.

b) Except as otherwise authorized, a warranty clause shall not be included in cost-reimbursement type contracts, since the warranty aspects of the clause 'Inspection of Supplies and Correction of Defects' are sufficient to protect the interest of the Government.

c) Any warranty clause included in a contract shall not limit any rights afforded to the Government by the provisions of the Inspection clause relating to latent defects, fraud, and gross mistakes that amount to fraud. Care should be taken to insure that the warranty clause used and any other warranty provision in the contract are consistent, especially where performance specifications are used."

When deciding whether or not to use a warranty clause ASPR presented the following factors for consideration.

"1) nature of item and its end use;

2) cost of the warranty and degree of price competition as it may affect this cost;

3) criticality of meeting specifications;

4) damages to the Government that might be expected to arise in the event of defective performance;

5) cost of correction or replacement, either by the contractor or another source, in the absence of a warranty;

6) administrative cost and difficulty of enforcing the warranty;

7) ability to take advantage of the warranty as conditioned by storage time, distance of the using agency from the source, or other factors;

8) operation of the warranty as a deterrent against deficiencies;

9) the extent to which Government acceptance is to be based upon contractor inspection or quality control;

10) whether because of the nature of the items the Government inspection system would not be likely to provide adequate protection without a warranty;

11) whether the contractor's present quality program is reliable enough to provide adequate protection without a warranty, or if not, whether a warranty would cause the contractor to institute an effective and reliable quality program.

12) reliance on 'brand name integrity';

13) whether a warranty is regularly given for a commercial component of a more complex item;

14) criticality of item for protection of personnel or property, e.g. for safety of flight;

15) the stage of development of the item and the state of the art; and

16) customary trade practices." [Ref. 2]

There are five basic types of warranties that have been used in many variations.

"1) Failure Free Warranty. In this type of warranty the contractor agrees to repair any part that fails during a specific period of time or other measure of operational use. One should be careful to assess the cost of this warranty in the initial price if there is a great deal of design uncertainty at the time of pricing. This type of warranty should be used when the uncertainty of the system is at its lowest point.

2) Correction for Deficiencies. The contractor is bound to correct any design, material or workmanship deficiencies that arise during the testing and initial operation of the system. This type and variations of it are good candidates for the use in reliability/maintainability considerations. A little more room exists for uncertainty which does not drive up the initial cost of the warranty.

3) Supply Warranty. A contractor would be required to replace or reperform work which was determined to be defective in material or workmanship. The defect must have existed at the time of acceptance and becomes more of a supplement to the inspection process. By having this type of warranty the Government is protected for a period against patent defects. Patent defects are those defects that should have been seen by reasonable inspection procedures. The biggest problem with this type of warranty is proving that the defects did in fact exist at the time of acceptance of the system.

4) Service Warranty. This warranty is basically the same as the previous except it is for services. Here as in the previous warranty type the problem is in proving that the defects did exist at the time of acceptance.

5) Construction Warranty. Used exclusively in construction type contracts the contractor is required to repair or replace, at his own expense, any nonconforming work as to specifications and any defect in workmanship, material, and contractor design." [Ref. 3]

Judging from the above definitions a failure free warranty or correction of defects would be the basic type of devices to be used in acquisition of hardware. These two types of warranties place the onus on the contractor to be responsible for defects existing from initial design to acceptance. In order to prepare for the possible expanded use of these warranties in the nature for which we have been discussing one should look at the experience that the Government has had in the past. As a part of that history are the Armed Services Board of Contract Appeals (ASBCA) and Comptroller General Decisions that give us insight into some of the problem areas in warranty use.

This study is a look at those decisions and an attempt to draw some conclusions from those decisions. This study is prepared to aid the future studies on warranty use in hopes that it will draw some attention to past problems. In the analysis of the cases a general breakdown into these seven areas is apparent: Burden of Proof, Implied Warranties,

Notice of Breach, Latent Defects, Duration of Warranty, Warranty by the Government, and Scope of the Warranty Clause. (See Appendix C). These areas characterize the types of problems that have arisen in contracts with warranties of some kind. Note that warranty and guarantee will be used interchangeably and are considered to have the same meaning. The Uniform Sales Act and Uniform Commercial Code¹ are considered applicable to Federal Government purchasing by the ASBCA and thus will be referred to as the basis of some of their decisions in the absence of ASPR coverage.

In the following discussion reference will be made to equipment, products, and services. The use of the term system is when a higher level of equipment combinations is looked at. This thesis is presented to look at the history of decisions on the sub-units (equipment) with the intention of expansion of the warranty to the system level.

¹ The UCC and Uniform Sales Act are used in non-government situations to protect the buyer even though the goods have been accepted. In these cases the warranty is used to determine the standards which the product must meet. The ASBCA has used these two documents in Government contracts when the cases were similar to previous non-government contract decisions.

II. ASBCA/COMPTROLLER GENERAL DECISIONS

A. BURDEN OF PROOF

In disputes over warranty provisions who has the burden of proving its right to demands? The Armed Services Board of Contract Appeals (ASBCA) has put this burden on the Government. They have set guidelines that must be followed to show that the decision should be in favor of the Government. These guidelines will be brought out as well as the quality of evidence accepted by the ASBCA.

The first case talks of a preponderance of the evidence necessary to prove default by a contractor. Webster's dictionary [Ref. 4] defines preponderance as "superiority or excess of weight, influence, number, etc; an outweighing." This means to me that a predominant amount of the evidence must point to the contractor as the cause of the problem.

The Government contended that a valve installed in air conditioning equipment had failed due to defective materials. Witness presented by the government stated that the break could have been caused by "metal fatigue." It was found that one of the witnesses had never seen the failed piece and that both had no metallurgical, engineering or scientific education.

The contractor was able to show that the equipment had been operated outside of specifications and this was the most probable cause of failure. Government principle witnesses conceded this to be the case.

The ASBCA said that "when the Government seeks to bring itself within the provisions of a warranty (or "guaranty") clause, it must show the failure of a contractor's compliance by a preponderance of the evidence (emphasis added). As the warranty in question was against defective workmanship and materials the Government did not show that the contractor was at fault [Ref. 5].

Looking at this case it is hard to judge just exactly what the ASBCA means by a preponderance of evidence. The amount of evidence necessary should depend on the case and the situation. One would hope that Government lawyers and contracting officers would gather better evidence than this case has shown for future case actions.

All of the evidence that was presented by the Government was expertly refuted by the contractor in the following case. The contractor's appeal to the ASBCA was sustained when the Government failed to prove the contractor at fault for the damages to diesel engines. The contract was to repair two diesel engines that were used to drive generators which provided the sole source of electric power on a ship. When a broken connecting rod failed on one of the engines the Government contended that the cause was due to insufficiently tightened nuts on the connecting rod bolt.

After hearing testimony from Government engineers and contractor inspectors as to how well the bolts were tightened, the ASBCA found that there was no evidence of defective work [Ref. 6].

Here again is more evidence that Government lawyers and the contracting officer did not spend enough time gathering the facts before they proceeded with their decisions.

Evidence that is presented by the Government may be true, however if the contractor can show other sources of probable cause, he may still win his case.

In a contract to weld cracks in a ship's steam system there was a preponderance of evidence to show that the contractor was responsible. However, this evidence did not show that the "most probable" cause of the subsequent leaks was the fault of the contractor. Testimony from witnesses on how tests were conducted and probable cause was not enough to convince ASBCA members.

All of the evidence presented showed that the cracks could have been from causes due to operational use. Thus, the Government did not link the defect directly to the contractor [Ref. 7].

There were two explanations as to why water faucets were found to be cracked after a period of freezing weather. The Government contended that the only way that they could have been damaged was by trapped water in the faucet. This could only have happened because the faucets were not installed according to manufacturer specifications.

The contractor came up with an alternative explanation which convinced the ASBCA that there was another way the damage could have happened. The contractor showed that the presence of water at that point could have been from improperly shutting off the water by the occupants of the house [Ref. 8].

The Government had the burden of proving defects existing in a cable and a fixed price construction contract. The cable had failed numerous times and the exact cause could not be determined. The Government was able to show that the defects in the cable existed before it was placed in the ground. The contractor had the burden to prove that the breaks could have been caused by faulty government specifications, which he did not.

The ASBCA found that it was necessary for the exact cause of the break to be determined. As long as the Government shows by a "preponderance of evidence" that there were reasons why the contractor was at fault, the Government has done its job. The contractor must show that the Government could also have been at fault in the cause of damage [Ref. 9].

These three cases seem to more or less tie down what the ASBCA is looking for. As long as enough evidence points to the cause of fault then the ASBCA will decide for the Government. The contractor must either disprove the Government's allegations or show that it could be the Government's fault as well.

One point that was brought out in the following case was subtle but was the probable cause for the Government losing the case. The Government must account for all the time that it has possession of the equipment. This was the essence of the decision in this case. A contractor was manufacturing sterilizing units which were shipped to various areas in a

region. When the units were inspected at the initial point of departure they were determined to be acceptable by government inspectors. There were no notations of any discrepancies. All reports of faulty door operation were after units were delivered to the operator.

The ASBCA decided that:

1) All statements given to them by the Government were only "broad assertions and general allegations" without any backup information.

2) The Government did not account for the sterilizers while in transit.

3) There was no showing that the deficiencies were "non-specification" or non-conforming [Ref. 10].

It is very hard to convince the ASBCA that a product is unsatisfactory when it has been inspected and accepted. This is if the warranty states that the product will conform at the time of delivery. When the statement "at time of delivery" is left out the burden seems to become less critical.

The Government tried to expand the statements of the warranty beyond its original intent. The warranty clause stated that a pump manufactured and installed by the contractor "shall be guaranteed by the contractor against any failure in the proper use or operation caused by defective material, workmanship, or design" was the basis for the finding by the ASBCA in this case.

A pump had failed and the Government wanted reimbursement under the conditions of the warranty clause. The Government

contended that the cause of failure was due to one of three factors:

- 1) a crooked well hole,
- 2) an out of line installation,
- 3) defective pump components.

The ASBCA decided that the first two faults did not come under the guaranty clause, as the Government contended but fell under the final examination and acceptance clause. Since the pump had been accepted in the condition it was in at the time of failure and the Government had failed to prove that defective material, workmanship or design, the appeal was sustained [Ref. 11].

In the above case the Government has interpreted the words of the warranty clause. They have attempted to expand the coverage beyond the expressed bounds.

The ASBCA has stated in two cases [Refs. 6 and 12] the following points that must be established by the Government to maintain its burden of proof:

- 1) defect is discovered within the time limit of the warranty.
- 2) that by affirmative showing, such defect was the result of fault or negligence on the part of contractor.
- 3) proper notice of alleged defects was given within the warranty period.

These three factors appear to hold for the ASBCA decisions throughout the cases involving warranty.

Conclusion:

The burden of proof does rest on the Government. The amount of evidence must be enough to show that the contractor is at fault. That evidence can be challenged as to correctness by the contractor. It can also be met with counter evidence that shows the Government could be at fault also. Notice that in either case the evidence does not have to point specifically to the cause.

The ASBCA has set three criterions that they will look at each time they hear a case. Depending on the case there may be other areas that they look at but the three points: that the defect was discovered within the time limit of the warranty; that by affirmative showing, such defect was the result of fault or negligence on the part of the contractor; and proper notice of alleged defect was given within the warranty period, were always present if not explicit then implied.

B. IMPLIED WARRANTIES

The ASBCA draws from the Uniform Commercial Code for the definition of an implied warranty. The Uniform Code section 15 states:

"Where the buyer, expressly or by implication, makes known to the seller the particular purpose for which the goods are required, and it appears that the buyer relies on the seller's skill or judgment, there is an implied warranty that the goods shall be reasonably fit for such purpose.

"Where the goods are bought by description from a seller who deals in goods of that description there is an implied warranty that the goods shall be of merchantable quality."

UCC 2-315 defines fitness of purpose "where the seller at the time of contracting has reason to know any particular purpose for which the goods are required and that the buyer is relying on the seller's skill or judgment to select or furnish suitable goods...."

UCC 2-314 talks of merchantable goods:

"Goods to be merchantable must be at least such as:

a) pass without objection in the trade under the contract description; and in the case of fungible goods, (fungible goods are those where all units are identical, i.e., grains of corn) are of fair average quality within the description; and

b) are fit for the ordinary purposes for which goods are used; and

c) run, within the variations permitted by the agreement, of even kind, quality and quantity within each unit and among all units involved; and

d) are adequately contained, packaged, and labeled as the agreement may require; and

e) conform to the promises or affirmations of fact made on the container or label, if any."

There are two types of purchases mentioned in the definition: one, the seller knows the particular purpose for which the goods are required and two, they are bought from a description. To condense the definition of implied warranties it could be said that they arise when purchases are made with the responsibility of the seller to furnish the goods that he knows will be appropriate or conform to advertised specifications.

An implied warranty may be excluded when the buyer specifically excluded it by statement in the contract or he has inspected the goods to his satisfaction. The inspection may mean the buyer has the opportunity to inspection whether he takes it or not. The following case is an example of such a point.

The case was one of a dispute over the sale of unuseable magnetic tape. The tape was to be used in a computer which had been using disc type components. The sale was based on the contention by the salesman that the magnetic tape would work as well as the discs at a cheaper price. After the Government purchased fifty of the tape units they found the units were unsatisfactory for use.

The ASBCA held that there could have been an implied warranty under either section 15 or section 2-315 of the Uniform

Commercial Code. The Government negated this warranty when furnished with a sample tape, it did not take appropriate steps to conduct a test for fitness of the tapes [Ref. 13].

One should realize when buying an item that when he does not thoroughly test the item he may get stuck with unuseable products. Necessary steps should be taken to know exactly what you are buying before the contract is drawn up.

An aviation corporation had a contract to manufacture and deliver thruster assemblies, frame, and capsule recovery system. These units are used in the ejection of a U.S. Air Force B-58 bomber. The assembly is used to display stabilization fins after ejection from the aircraft. These fins prevent oscillation of the capsule for a short period of time after ejection. Oscillation would be dangerous to the pilot. The fins are deployed by a piston in the thruster assembly. The piston is activated by an electrically-initiated cartridge. This cartridge is the subject of the dispute.

During test of the production line sample of the cartridge it was found that thrust in excess of Stanley Corp. specifications developed. Stanley asked the Air Force to allow them to change the specifications. Stanley had determined that the excess pressures were not detrimental to the operation of the system.

The Air Force refused and proceeded to terminate the company for default. The claim made by the Air Force was that Stanley had breached an implied warranty of fitness for a particular purpose and quality.

The ASBCA's opinion was that the only issue before it was whether the thrust developed by the cartridges rendered use of the thruster frame assemblies unsafe or detrimental to their use. After hearing the comments by experts and going over the test data the ASBCA determined that there was no unsafe damage and that the cartridges could be safely used.

As a result of this determination the ASBCA held that the default termination should be changed to termination for convenience. A result that would net the contractor considerably more money than the previous termination.

Aside from the final decision the contractor wanted the ASBCA to cause the Air Force to re-open the contract and continue to buy the cartridges. ASBCA said that this was not within the powers of the board and that further negotiation with the Air Force would be in order [Ref. 14].

Failure to meet specification could be considered a breach of an implied warranty. The problem goes further, however, if the Breaching party can show that no change has come from the short fall then the ASBCA will probably react in their favor.

Conclusion:

Implied warranties in Government contracts are the exception rather than the rule. The Government normally has the opportunity to inspect the items thoroughly. However, as we have seen a couple have come before the ASBCA and resulted in losses to the Government. The first a case where

failure to test goods negated the warranty. The second, a claimed implied warranty which was not held to be true by the ASBCA.

C. NOTICE OF BREACH

In order for the Government to protect its interest under the warranty clause it must give a formal notice of breach [Ref. 2]. A notice to the contractor of breach is written by the contracting officer. Breach refers to a breach of warranty, where some item or service does not conform to specifications in the contract. These specifications must, however, be covered by the warranty clause before the action may be taken. The formal notice of breach is thus an important first step in the execution of a warranty.

In this case the Government was able to collect on a warranty after it had been expired. The contractor warranty was to the effect that the supplies would conform to specs at the time of delivery. Samples were taken at the time of shipment. However notice of nonconformance was not forthcoming until two and four months after delivery. The ASBCA considered the notice to be timely because the contractor had warranted the supplies as to conformance at the time of delivery. Because the samples were taken at the time of delivery the delay of the notice was not considered excessive [Ref. 15].

One must be careful when looking at this case. In some following cases we will see that the ASBCA consider a four month delay in notice of breach to be excessive. The point of having the samples taken at the time of delivery appeared to be the deciding factor.

The length of time before notice and after discovery of deficiencies in systems or subsystems is critical. The Government has lost large sums of money because of a delay in notification of breach of only four to five months. An example of one case where the Government failed to give notice four and one-half months after discovery of the defect. The ASBCA felt that this was too long a time and considered an untimely notice.

The Uniform Sales Act requires that claims for breach of warranty must be made within a reasonable time after the buyer knows or should have known of the breach. The ASBCA held that the requirements of the Uniform Sales Act are expressions of Federal law and are applicable in Government contracts.

The case involved the shipment of onions from the contractor's plant to various government receiving points. The first shipment was inspected and accepted at the plant and subsequently shipped. A second shipment was inspected about two weeks after the first. The second inspection revealed foreign matter in such quantity as to reject the shipment. Under the provision of the Federal Food, Drug and Cosmetic Act stating

"The provisions of the Federal Food, Drug and Cosmetic Act and regulation thereunder, including labeling requirements, shall be complied with, and shall govern the rights and obligations of the parties insofar as applicable, whether or not the products to be delivered hereunder are shipped in interstate commerce and whether or not provided for in specifications. The fact that products have been inspected and passed or accepted shall not act as a waiver of this requirement;"

the Government had the first shipment reinspected. The subsequent failure of the inspection was not disputed by the contractor. The contractor contended that the delay between Government knowledge of the breach and actual notice delivery was too long.

ASBCA agreed with the contractor and determined the four and one-half month delay was excessive [Ref. 16].

In a decision by the Comptroller General this subject of timeliness of notice appeared. In this case a contractor was to deliver 6,068 lbs. of chickens to a military installation. The chickens were inspected during processing and packing. They were accepted for shipment. At destination an inspection from the Veterinary Corps of the Air Force base certified that the chickens were inspected and that, "they conform to contract and have been accepted." A portion of the chickens were left out of cold storage from the 24th of November to be served on the 29th of November. This length of time was customary for gradual thawing and processing.

During the processing the chickens were determined to have a bad odor. A reinspection by the base veterinarian found that the chickens were indeed bad. A subsequent reinspection of a portion of the chickens in cold storage showed that they were also defective and unuseable according to the inspector.

A decision by the contracting officer through advice from the Chief Counsel, Headquarters, Quartermaster Market

Center System, was to pay the contractor for the shipment. This decision was based on the statement by counsel that "...the chickens had been finally inspected and accepted by the Government," unless the defects were considered latent, or unless fraud or such gross mistakes as amount to fraud were existent, there was no legal basis with which to deny payment.

Nine months later the Food and Drug Administration sampled the remaining chickens and advised the contractor to refund the money because the chickens did not conform to the requirements of the Food, Drug, and Cosmetic Act, 21 U.S.C. 301. The contractor refused to make the requested payment or to pay any amount.

According to the Comptroller General, "A contractor, who nine months after delivery, reinspection and payment in full, is notified that the supplies did not conform to the warranties in the purchase order may not be regarded as having received a notice of the breach of warranty by reason of his presence at the reinspection. A nine months' delay in giving actual notice is clearly unreasonable under the Uniform Sales Act which is in effect in the state where the contract was executed and performed. It also precludes the Government from asserting a claim from damages for breach of warranty."

The Comptroller General went on to say that "the necessity of complying with the notice requirements of the above section in order to preserve the Government's rights to

claim damages for breach of warranty has been recognized in the Federal courts, U.S. vs American Radiator and Stand. San. Corp., 115 F. Supp. 422; U.S. vs Dewart Milk Products Co., 9 F. 2d 705; Champlin vs U.S., 297 F. 503" [Ref. 17].

The Government can give a formal notice of breach without knowing the actual cause of the defect. This was upheld in the following case.

A notice of breach was given before the expiration of the warranty. In the notice there was mention that steel drums delivered to the Government leaked. No mention as to the cause of the leaks was given. After the warranty period expired the cause was determined to be faulty seams and poor glue. The contractor contended that the warranty had expired and the notice was not given in a timely manner.

The original notice of breach was considered timely by the ASBCA. The cause of the defect does not need to be determined before a notice is issued. Causes can be determined after the formal notice [Ref. 18].

In another case concerning the timeliness of the notice the ASBCA had to determine when the warranty period started.

The warranty clause stated "all supplies furnished under this contract will be free from defects in material or workmanship and will conform with the specifications and all other requirements of this contract." The Government notified the contractor after all items had been delivered even though it was well known by Government that the items did not conform. The items were small pins used in helicopter

engines. These pins were to be tapered to a certain specification and were not done so.

The contractor contended that the notice was untimely since the Government had not notified him until all the pins were delivered. The ASBCA found that the notice of breach was within a one year period after delivery of the last lot. Even though the Government knew about the nonconformance prior to acceptance, it was justified in invoking the warranty clause when it did according to the ASBCA [Ref. 19].

Notice also that the knowledge of defect prior to acceptance did not preclude the Government from exercising the warranty after acceptance.

Conclusion:

A formal notice of breach is required and must be given within a reasonable time after discovery by the contracting officer. The decisions concerning reasonable time have not been conclusive. A time frame of around four months after discovery is a good figure to work with. This, of course, depends on the circumstances surrounding the case.

Looking at the way the ASBCA and Comp. Gen. have considered the notice, a formal notice should be given when it is known a breach exists. This notice may not contain the causes of the breach but it will alert the contractor of impending warranty covered correction of defects.

As we shall see later the cause of the defect will normally be determined eventually.

D. LATENT DEFECTS

The inspection clause specified in ASPR 103.5 is required in all fixed price type contracts. It provides that acceptance by the Government shall be conclusive, "...except as regards to latent defect, fraud, or such gross mistakes as amount to fraud." Latent defects will be the only aspect considered in this paper because of its direct relation to a warranty covered defect.

The definition of latent defect according to the ASBCA is "In the sale of goods a latent defect is by definition a defect that cannot be discovered by reasonable inspection" [Ref. 20].

Coverage of latent defect under the Inspection and acceptance clause is an extension of the warranty clause. This means that the warranty covered all defects as they are related to the specific terms of this clause. A latent defect extends this to cover defect that could not be discovered and did not fail during the warranty period. This extension is termed cumulative nature of the two clauses. The following case will show what is meant by cumulative.

The ASBCA considers the warranty clause and Inspection clause to be cumulative. That is the warranty affords the government protection against defects which might otherwise be waived during that period. The Inspection clause adds to the warranty by saying that if latent defects are apparent then the Government is still protected. This last protection is considered to be "without regard to time."

The above conclusions come from a case involving a leak in a steam line. The leak occurred after the warranty period, but was determined to be latent. The ASBCA considered the defect undiscoverable [Ref. 21].

Concerning the cumulative nature of the clauses the ASBCA had determined in a 1967 case that the right to claim latent defect in the Inspection and Acceptance Clause was not lost by reason of an inclusion of a warranty clause [Ref. 22].

From these cases we see that latent defects are constrained extensions of the warranty clause. Constrained in the fact that they must be proven to be latent by the definition and not patent. Patent defects are those that could and should be discovered by normal and reasonable inspection. Also note that the first case does not put a limit on the contractor liability for latent defects. We will see in the rest of the cases presented that time limit is not considered and proof of defects being in fact latent most important.

A determination of when the system has been accepted and if a proper inspection was made is necessary to the discussion of latent defects. The Uniform Sales Act, section 48, defines acceptance as follows: "The buyer is deemed to have accepted the goods when he intimates to the seller that he has accepted them; when the goods have been delivered to him; when he does any act in relation to them which is inconsistent with ownership of the seller; or when, after the lapse of a reasonable time, he retains the goods without intimating to the seller that he has rejected them."

The Board has upheld this definition by finding for the contractor when it was determined that the Government had not specifically stated, "We reject these units." Also, there had been progress payments in full for the lot in question. The ASBCA held that the Government had no right to rescind the acceptance except for latent defect, which had not been proven [Ref. 23].

In another case an honest mistake by the inspector was excused by the ASBCA. The rule as determined by the Board is that, "A buyer is not precluded from asserting an expressed warranty merely because he might, by the use of ordinary care and diligence, have acquired knowledge of the defect, since the warranty is to exempt the buyer from the necessity of exercising diligence in this respect" [Ref. 24].

As a result of this case the inspection process has some room for mistakes. However, after the warranty expires, the basis of determination would be as to latent defects, fraud, etc. In the Market Equipment Ltd. case above, the expiration of the warranty would have put a different perspective on the case. The Government would have had to prove that the defect was latent and could not have been discovered by the inspector. There is no provisions for inspector error when trying to prove deficiencies as being latent.

Inspection is a very precise thing. The inspector has the responsibility of doing a thorough job. A decision and finding was issued by a contracting officer when he found latent defects existed in equipment. In the contractor's

appeal he contended that the units were not latent; that if the units were defective, the defects were not latent: that he was not guilty of fraud; and that acceptance was conclusive and binding.

The ASBCA determined that the units were in fact defective, but the defects were patent vice latent. The defects were in the size of a machined piece of equipment and the use of a washer to make up the space. Also, there was an extra hole bored in the units which was improper. The ASBCA found that the inspector knew about the extra hole. He could have measured the piece without any special tools. Therefore, the Board found the defects were patent and that the defects could have been discovered by reasonable inspection. The Government waived its right to compensation upon final acceptance [Ref. 25].

The ASBCA puts a lot of emphasis on the discoverability of defects during inspection. Sometimes there are subtle differences between what is discoverable and not. In the following cases we will see such subtleties.

Failure of steam cleaners to hold up under normal use conditions was the subject of dispute in this case. The cleaners had failed because pumps were of the wrong type, firepot material was improper, and the design of the heating coil holders was wrong.

The ASBCA first affirmed their definition of a latent defect as "one that is hidden from the knowledge as well as from the sight and which could not be discovered by ordinary

and reasonable care or by a reasonable inspection." In this case the ASBCA found that inspectors could have looked at the units as they were being put together. The Government had contended that the discovery of the defects would have necessitated the disassembly of the units. They also found that nonconformance to Government specification should have been discovered.

In conclusion the ASBCA stated that "it is well established that a defect which can be readily discovered by an ordinary examination or test is not latent and failure to make such an examination or test does not make it so" [Ref. 26].

A Government move to show that defects were latent failed. The ASBCA found that, even though the defects were found by testing shortly after acceptance, the defects could have been discovered before acceptance. The ASBCA stated that "it is well established that a defect which can be discovered readily by an ordinary test is not a latent defect. The failure to apply the test does not make it so. The finality of acceptance under the cited provision is not diminished by such failure" [Ref. 27].

A construction contract which called for the installation of flooring tile in a building was the subject of this dispute. The problem arose when the tile started to buckle and the contracting officer wanted the contractor to replace the flooring. The contractor refused to replace the flooring, contending a final acceptance and payment had been made by the Government.

The ASBCA held for the contractor because there was no evidence that proved latent defect as defined by the inspection clause. The decision was based on the fact that Government officials had accepted the type of tile and glue that was used. A claim of breach of warranty was also not accepted because there was no evidence of defective material or workmanship [Ref. 28].

In the steam cleaner case even though the inspection did not call for inspection of production line units in various stages of assembly the Government's excuse for not being able to see the defects was not good enough. The ASBCA held that it was possible for them to inspect the disassembled units if they so desired.

The case where defects were found shortly after testing, the appeal was sustained because a test done shortly after the acceptance could and should have been done before the acceptance. In the flooring installation case, the Government had approved and accepted the material prior to installation and had thus waived their rights to a latent defect claim when these materials failed. These points the author considers to be subtle and important to latent defect determination.

There was a case where the ASBCA determined a test to be unreasonable if required during normal inspection. The contractor was to furnish refrigerators to the Government. When these refrigerators were x-rayed by a Government officer, the units were found to have a defective strainer. This

type of defect could not ordinarily be detected by standard inspection methods. Since x-ray was not part of the usual inspection because of expense and time the ASBCA determined the defect to be latent [Ref. 20].

This case shows that the ASBCA will accept a limit to inspection, but there should be a reasonable explanation as to why the defect was not discovered before acceptance.

To what extent is the contractor responsible for cost of repairs. The following case puts the ASBCA on record as to what it thinks the extent should be.

The fact that defects in axle assemblies, a component of gun carriages, were latent was not disputed by a contractor. The dispute arose over charges assessed by the contracting officer on the contractor for disassembling and reassembly of the gun carriages when corrections were made. The contractor contended that these charges were beyond the scope of the necessary amount to correct such defects.

The ASBCA found that removal and reinstallation of the axle assemblies in the gun carriages, "when necessary for the replacement of defective parts," was an allowable cost [Ref. 22].

The eventual use of a piece of equipment is very important when contracting to purchase that equipment. The Government lost a case because the specifications did not specifically state that compressors would be used over rugged terrain. Defects in these compressors were not latent because the contractor had no way of knowing the compressors

would be used other than the normal static operation. Compressors of this type had been used for a number of years by private companies with little or no abnormal problems [Ref. 29].

The final case is to bring up a point of the Government's usual haste to get things accomplished. In this case, haste on the part of the Government was determined to be the cause of failure. Although warned by the contractor that the subgrade was not dry enough for paving, the Government insisted on proceeding with the operation. Following the break-up of the pavement, the Government could not prove that the break-up was due to other factors than damp subgrade. The ASBCA determined that the Government had, through haste, waived its right to claim latent defect [Ref. 30].

Conclusion:

The addition of latent defects in the inspection clause serves to supplement the warranty clause by extending the contractor's liability for the system or subsystem. During the effective time of the warranty, the strictness of proof for latent defects is not necessary. However, when the warranty runs out, the burden is entirely on the Government to prove that the defect is in fact latent and not patent. The Government must be careful not to compromise its position by forcing a contractor to proceed with work when that contractor has recommended against such action.

The inspection process must be reasonable and the inspector must be aware of the environment around him. The

Government lost a case in particular because an inspector let facts slip by him that should have been caught. The contractor is obligated for latent defects during the life of the system. A poor inspection may give him the release he needs to keep from paying for cost of correction.

E. DURATION OF WARRANTY

ASPR 1-324.5 A/B talks about the duration of the warranty. ASPR contends that even though the terms and conditions of a warranty will vary with each procurement the clause must contain a statement as to the duration of the warranty. The contractor should be liable for such defects or nonconformance which develop "prior to the expiration of a specific time period or before the occurrence of a specific event" [Ref. 2].

The clause should include a period in which a notice must be given. In most cases this period will begin at the time of delivery of the system. In some cases the start period will be deferred until the supplies are actually put into use [Ref. 2].

The normal time period for most of the warranties is one year. The following is a compilation of ASBCA decisions covering this area.

In the following case a dispute arose over the failure of paint to conform to specifications. The paint had been inspected, accepted, and placed in storage for a period of time. When the paint was readied for use, it was found to be defective. The Government wanted the paint replaced because of its failure to conform to specifications.

The contractor had guaranteed the paint would conform to specifications at the time of delivery. This guarantee was to run for one year from the time of acceptance. The contractor was not aware of the storage procedures and could

not be held responsible for government control. The contractor contended improper storage was the problem. The Government failed to prove that the paint did not remain in useable condition for a reasonable time.

Because the paint was guaranteed for conformance at delivery, the Government did not win reimbursement. The lack of information to the contractor and poor storage procedures was the cause of paint failure and not subject to the warranty [Ref. 31].

When a warranty only covers goods conformance at the time of delivery, the Government must prove that it was in fact defective at the time of delivery. The Government's contention that the paint should have remained useable for a period of time after acceptance was denied by the ASBCA which held to the strict meaning of the term "conformance at delivery."

The major problem with duration of warranty determination is the starting date. The date is variable and will depend on when acceptance of the individual item has taken place.

In the Santone Construction Company case the company did not pay for repairs on equipment. The Board determined that the date of acceptance was when the keys were turned over to the Government and not from the final payment date as the Government contended. There was no notation as to any items not accepted at the key turnover which meant the one year warranty had expired on the units [Ref. 32].

Turnover and final acceptance was not the beginning of the warranty period in this next case. Portions of the equipment had not been accepted until sometime later. The ASBCA determined the warranty had started when the equipment was finally accepted and not when the unit in which the equipment was installed was turned over [Ref. 33].

Conclusion:

The duration of a warranty is normally agreed upon in the contract. One year is usually the period the contractor is responsible for his product integrity. Most important in this period determination is the start of the period. The period starts at the time of acceptance unless otherwise specified in the contract. The term acceptance means each unit or subsystem must be accepted. When that unit is not accepted for one reason or the other the warranty starts on that unit when it is finally accepted.

F. WARRANTY BY THE GOVERNMENT

This type of warranty is not written in specific terms of a contract. This is the type of warranty that arises when the Government furnishes specifications, equipment, material, or promises to do something in relation to the contract. From the reading of the case the author has come up with a working definition of exactly what a warranty by the Government means. A warranty could be claimed or developed when the Government agrees to do something and does not follow through with that agreement.

When the Government contracts work to be accomplished based on its own specifications there is an implied warranty by the Government that these specs are correct. The Government must be sure that the plans and details of the specifications are absolutely correct. In a case where building plans and specifications were furnished by the Government, a contractor was reimbursed for cost of repairs due to these faulty plans [Ref. 34].

The Government implicitly warrants the specification if the contractor complies with them in detail. When deficient specifications prevented or delayed construction, the contractor was entitled to recover damages for the Government's breach of a government warranty [Ref. 35].

All of the cases listed related to specification warranties were in construction of buildings. These similar decisions could be applied to any project that uses government specifications as the sole basis for construction. When

government specifications are to be used one should make sure they have been tested in some manner to insure accurate, up to date data and procedures. Once the plans have been decided on a close surveillance of the process should be made to detect any errors in the specifications which might lead to defects due to faulty specifications.

Another area of concern is the adequacy of government furnished equipment and material. The Comptroller General decided that a contractor was entitled to payment of a claim for damage to his equipment caused by unsuitable government-furnished material. The Government had a duty to supply material that was fit for use in connection with the equipment. Even though a contract clause placing the liability entirely in the contractor's hands for all risk or loss, the hazards were determined to be only for those involving other than the fitness for use of the material provided by the Government [Ref. 36].

A preference rating in a contract is a rating that tells a prospective contractor what the priority of the proposed contract will be. This is very important because a high priority contract will allow the contractor special privileges in obtaining raw materials. This rating could affect the price of a bid by a considerable amount.

A notation of a preference rating, under which, in its original form, a contractor could obtain materials, was amended prior to acceptance of the specific bid. The Comptroller General concluded that the statement of anticipated

rating was not a warranty that it would come about, but that in light of the change the contractor was do relief from payment of liquidated damages for the delay it caused [Ref. 37].

The word "suggested" was used in the estimate of the amount of garbage to be picked up in a certain area. When this amount increased the contractor wanted extra compensation for the excess. The Comptroller General found that although the Government implied the amount of garbage to be picked up, this did not constitute a warranty because of the word suggested [Ref. 38].

Conclusion:

The Government takes on a large responsibility when it promises to respond to conditions in connection with the contract. If the Government does not carry out its obligations there is a high probability that it will pay highly in the long run. The solution would be to make all contracts contractor-furnished equipment and performance type specifications. This would put the burden on the contractor for completion of the contract. Unfortunately things don't always work that way. Thus when this type of requirement arises the Contracting Officer should be aware of this problem and make sure things get accomplished properly.

G. SCOPE OF THE WARRANTY CLAUSE

Throughout this section specific words or terms have been taken out of the clause to be defined. There are four cases that dealt directly with the wording or meaning of the clause. This section is entitled the scope of the warranty clause because it deals with the meaning of the words and phrases in the clause.

The first case dealt with the phrase "correct or replace." In this case the ASBCA sets down its definition of correct or replace.

A warranty stating that the contractor "correct or replace" articles found to be defective were subject to constrained interpretation by the contractor. The contractor had supplied defective generating units and had repaired the defect. He contended he should not be obligated to pay personnel costs since those costs were not covered by the term "correct or replace."

The ASBCA drew its definition of correct and replace from the Webster's New International Dictionary, second edition, to make the decision. "Correct" as a verb is defined in the following terms: "To make or set right, to remove the faults or errors of; rectify." The phrase "to replace" is defined in the following terms: "To place again, to restore to a former place, position, condition or the like." The ASBCA stated that "the meaning of contract language cannot be determined solely by resorting to the dictionary meaning of isolated words." They must also look at the entire contract

and clause to try to determine the intent of the phrase. The ASBCA found that by looking at the damage incurred and the intent of the warranty that the correction required more than substitution of parts [Ref. 39].

A warranty that covered defective material, workmanship, or design of all articles and supplies did not encompass poor workmanship by a contractor during the installation of a 10" valve. The valve was poorly installed in a line and subsequently failed.

The ASBCA held that the contractor was not responsible for correction and replacement of the valve because the type of causative breakage was not covered by the warranty [Ref. 40]. The breakage was due to installation which the clause did not specifically mention.

Reprocurement cost assessment was found to be excessive by the ASBCA. The warranty clause stated that the Government may "retain such articles, where upon the contract price thereof shall be reduced by an amount equitable under the circumstances and the contractor shall make appropriate repayment."

Because there was no mention of reprocurement cost assessment the ASBCA held that the Government could not collect on those costs [Ref. 41].

Performance specifications were used in this contract. A performance spec means that the contractor is responsible for the design of the equipment or system that must meet specific performance criteria as stated in the contract.

The dispute was over defects in steam lines installed in a building. The lines had started leaking and the Government contended that the contractor's faulty design was the reason. The warranty stated that, "Any parts found defective due to Tenney Engineering, Inc. workmanship within one year from date of acceptance and on inspection by the contractor, will be replaced by Tenney Engineering, Inc. at no cost to the Government."

The ASBCA decided that since the warranty did not specifically cover design that fault in design could not be claimed under the warranty clause. The Government would have had to prove faulty workmanship before the warranty could be applicable [Ref. 42].

Conclusion:

Wording of the clause is very important. The Contracting Officer should make every effort to construct the warranty clause so that it fulfills all the requirements necessary for the Government protection.

III. IMPLICATIONS OF DECISIONS

A. USE OF WARRANTY AT PRESENT LEVEL

All except two or three of the decisions presented were by the ASBCA. There was a noted lack of Comptroller General considerations of the warranty subject. From looking at these decisions by Comp. Gen. there is strong indication that the decisions are based on the same principles as held by the ASBCA.

These principles are illustrated in the breakdown of areas of discussion. The Government is responsible for the burden or proving its reasons for invoking the warranty clause. A timely notice that the warranty has been breached must be given by the Government. The length of time that the warranty is to cover should be stated specifically in the clause along with the specific commencement date of such a time period. The coverage or scope of the clause is specific and should include exactly what the Government expects to be protected. Implied warranties and warranties by the Government are areas a contracting officer should be aware of and work with them to the maximum extent possible. Latent Defect claim is the Government's recourse in the event of an expired warranty or absence of a warranty.

The burden of proof rests entirely on the Government to prove its claim against the contractor. The contracting officer should be aware of all the parameters in the case and

be ready to present expert and accurate information. The contractor need not necessarily disprove the Government's claim, but can show that the Government can be at fault as well. When evidence was presented as to the Government sharing responsibility for damage or defects then the ASBCA sustained the contractor's claim against the Government.

Within the burden of proof the Government should make sure that the claim is, in fact, covered by the warranty clause. In the Scope of Warranty section the cases showed that the Government's claim was based on good foundation as to cause, but the cause was not covered under the warranty clause. Careful consideration of just what elements should be covered is mandatory in this instance. Workmanship, design, and material defects are the most prevalent in the clauses. Others might include warranty to attain specific performance characteristics, level of safety, or other desired objectives.

Being aware that a warranty exists on a piece of equipment is the job of each manager who is involved with the operation of that equipment. Once a defect is observed the contractor should be put on notice that such a defect exists. This should ensure that losses due to failure of timely notice will not occur. The notice can be given before the cause of the defect is known. The Contracting Officer must be reasonably sure that a breach has occurred and that substantial evidence is forthcoming to prove the aspects of the breach.

In connection with the notice, a good understanding of when the warranty expires is important. A notice can be timely as in terms of time from discovery to notification, but be too late because of expiration of the warranty. A warranty may start on portions of the equipment at one time and at another time on other portions of the equipment. This has to do with when each individual piece of equipment is accepted by the Government. When acceptance is deferred for a time on one part of the equipment the commencement of the warranty is delayed on that part until it is finally accepted. In this case accurate records should be available to the Contracting Officer as to when each individual piece of equipment is accepted. This would give him the exact date for which the warranty will run out on that piece of equipment.

An implied warranty and warranty by the Government are similar in nature. The implied warranty term is used when the contractor has promised to produce, deliver or execute something in the contract. The warranty by the Government is when Government promises to deliver, produce or execute something in a contract. These warranties are not written down in the contract as a stated warranty. They are, however, present when the Government or contractor fails to uphold one of its promises. One way to preclude these types of warranties is more attention to what causes the warranty itself. A conscientious effort to comply with the terms of the contract should be made. Accurate administration of the

contract on both sides to keep track of impending obligations will aid in lowering the incidence of claims from this type of warranty.

Latent defects was inserted because it is somewhat of an extension to the warranty. The latent defect is timeless, but an extra measure of proof must be met in order for a defect to be proven latent. Conclusive evidence must be shown to prove that the defect was not discernible under the normal inspection process. This does not mean as long as the inspector follows the prescribed inspection procedures an undiscovered defect will be latent. The procedures may not be conclusive enough and this is no excuse for showing a defect to be latent. Considerable attention should be put on the inspection process to ensure a reasonable inspection. If this has been done then latent defect will in fact be an extended coverage beyond the warranty. A latent defect can exist with or without a warranty clause because it is stated in the inspection clause. The Government thus has some protection even without a warranty clause.²

² Appendix C is a summary of the coverage of the major problem areas of the warranty. Notice the lack of coverage by ASPR on these subjects.

B. EXPANDED USE OF WARRANTY IN RELIABILITY/MAINTAINABILITY CONSIDERATIONS.

The warranty cases that have been presented have been in regard to state of the art equipment. Most of the warranties have been for individual units of a bigger system. These units have normally been products that are state of the art in design. Some of the warranties discussed were for food products and some dealing with construction work.

None of the warranties presented in the cases covered weapons systems or other products of a highly sophisticated nature. The state of the art was not being pushed in these warranties, therefore design was stable and somewhat predictable. A product that is developed in the state of the art will have some kind of history of performance for the contractor or rely on when considering the warranty that will be acceptable. When a system or product is developed in the state of the art it means that technological thresholds are not being pushed and the design is not high risk in nature.

Consideration for expanding the use of a warranty into the reliability/maintainability arena has been suggested. The use of a warranty to motivate early design considerations of contractor to design in maximum reliability and maintainability. The use of a warranty in this manner should be considered only after careful consideration and analysis. This thesis has presented areas of concern that have arisen in present and past warranty use by the Government. To

expand the warranty these areas should be kept in mind during the process of preparing the warranty.

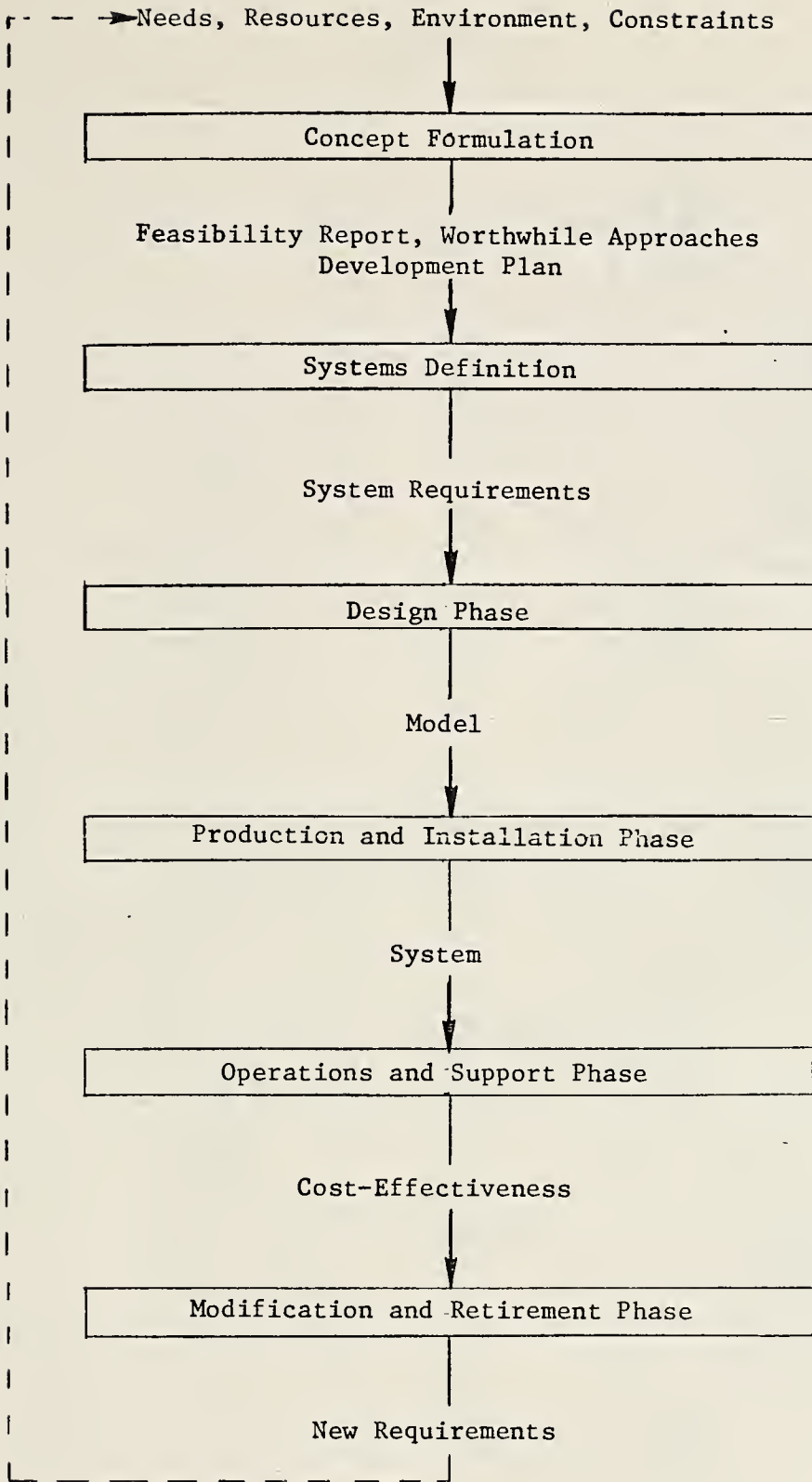
Before the actual preparation of the warranty there are many areas that must be covered before deciding to use a warranty as a reliability/maintainability enhancing device.

Some of these areas are:

- 1) type of equipment and complexity,
- 2) cost of the expanded warranty,
- 3) potential outcome of warranty use,
- 4) alternatives to the use of warranty.

These areas and many more should be the subject of further study in the expanded use of warranties to enhance reliability/maintainability.

APPENDIX A



System Life Cycle

[Ref. 43]

APPENDIX B

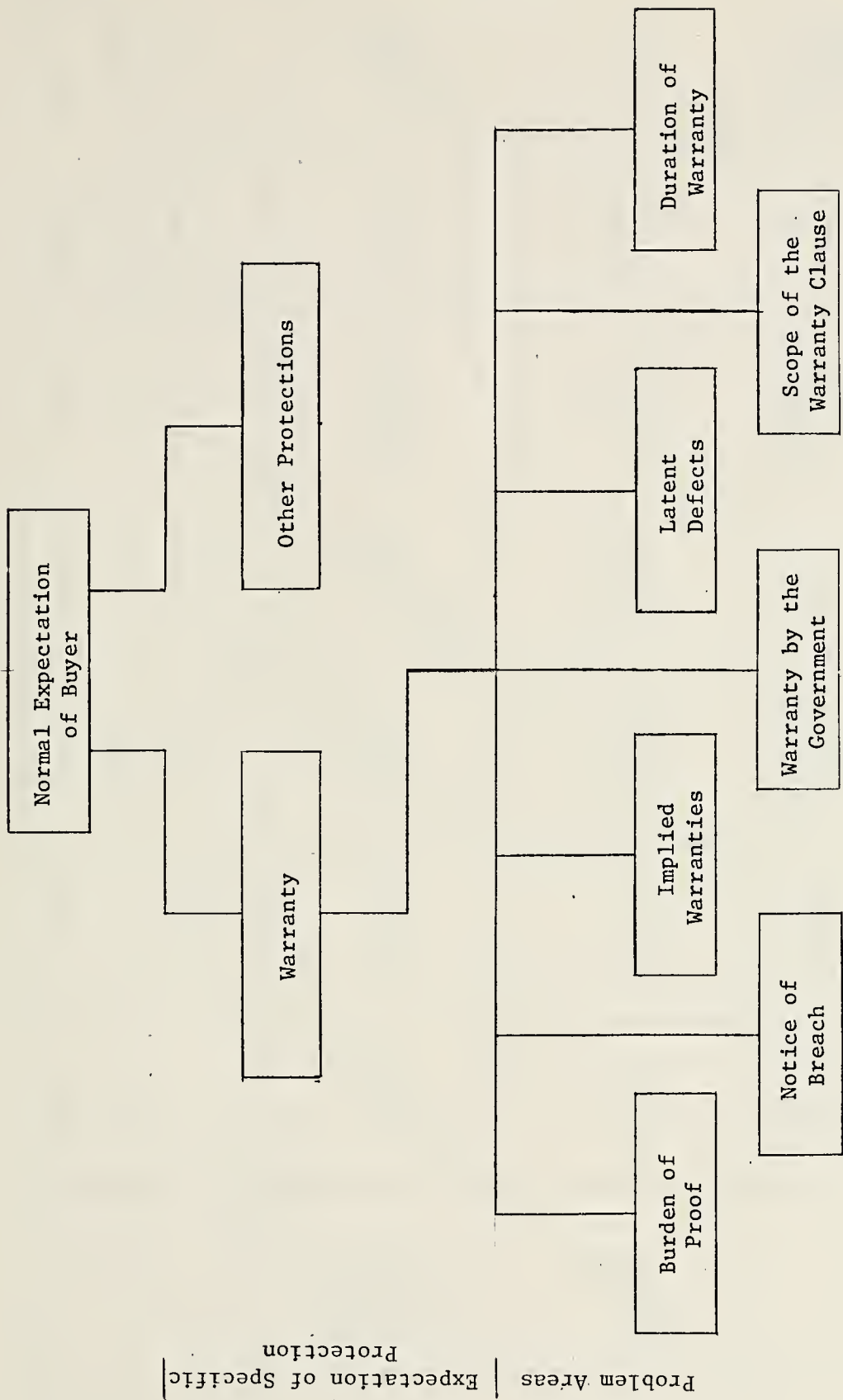


Diagram of Buyer Expectation

APPENDIX C

	Burden of Proof	Implied Warranties	Notice of Breach	Latent Defects	Duration of Warranty	Warranty by the Government	Scope of the Warranty Clause
<div> <div>Board & Court Decisions</div> <div> <div>Armed Services Board of Contract Appeals</div> <div>Comptroller General</div> </div> </div>	Considerable Coverage	Partial Treatment	Considerable Coverage	Considerable Coverage	Incomplete Coverage	No Coverage	Considerable Coverage
	No Coverage	No Coverage	Incomplete Coverage	Incomplete Coverage	No Coverage	Partial Coverage	No Coverage
Regulations	No Coverage	No Coverage	Incomplete Coverage ASPR 1-324	No Coverage	Specific Coverage ASPR 1-324.1 1-324.5	No Coverage	Complete Coverage ASPR 1-324.6

Table of Coverage



LIST OF REFERENCES

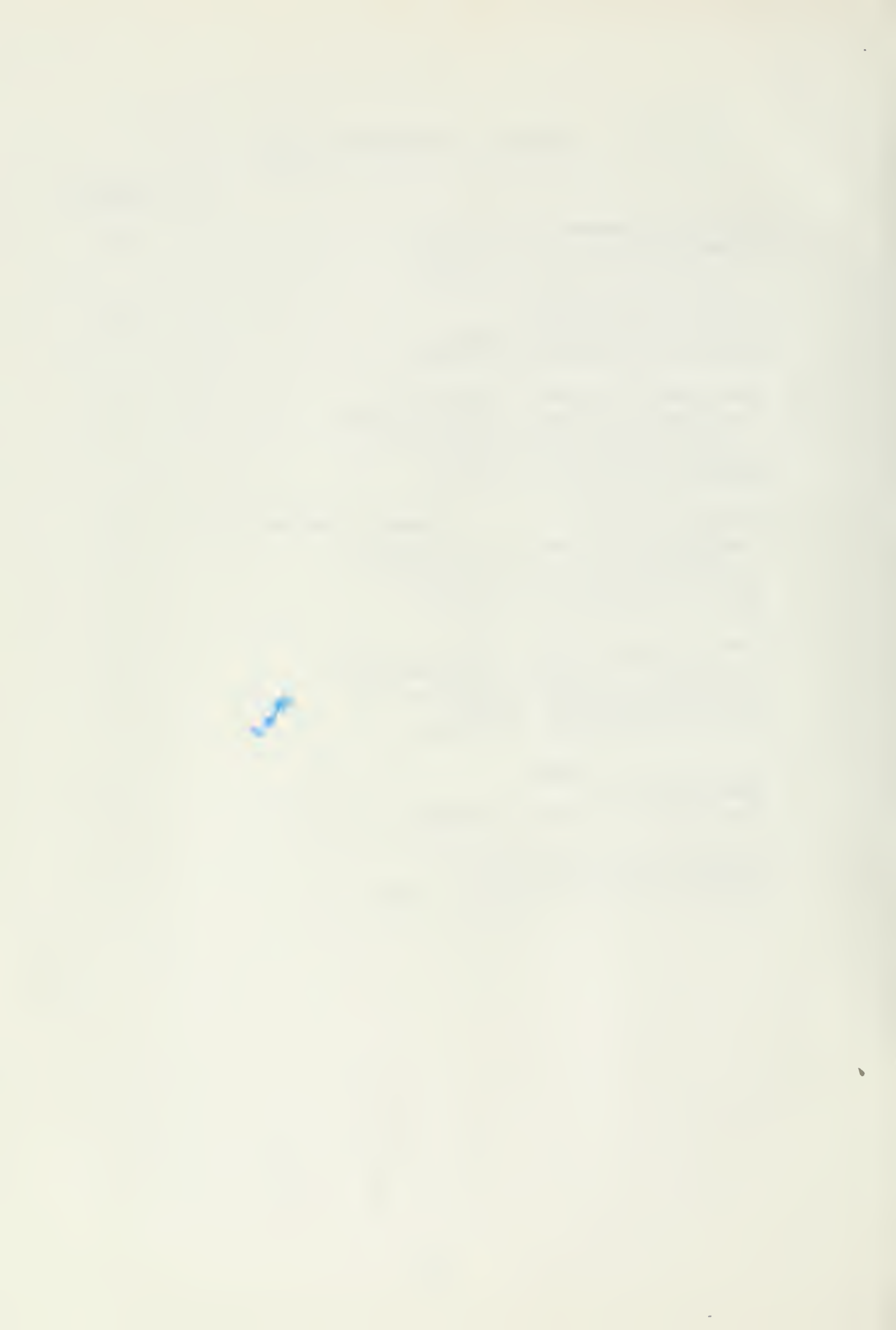
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